

No. 662,121.

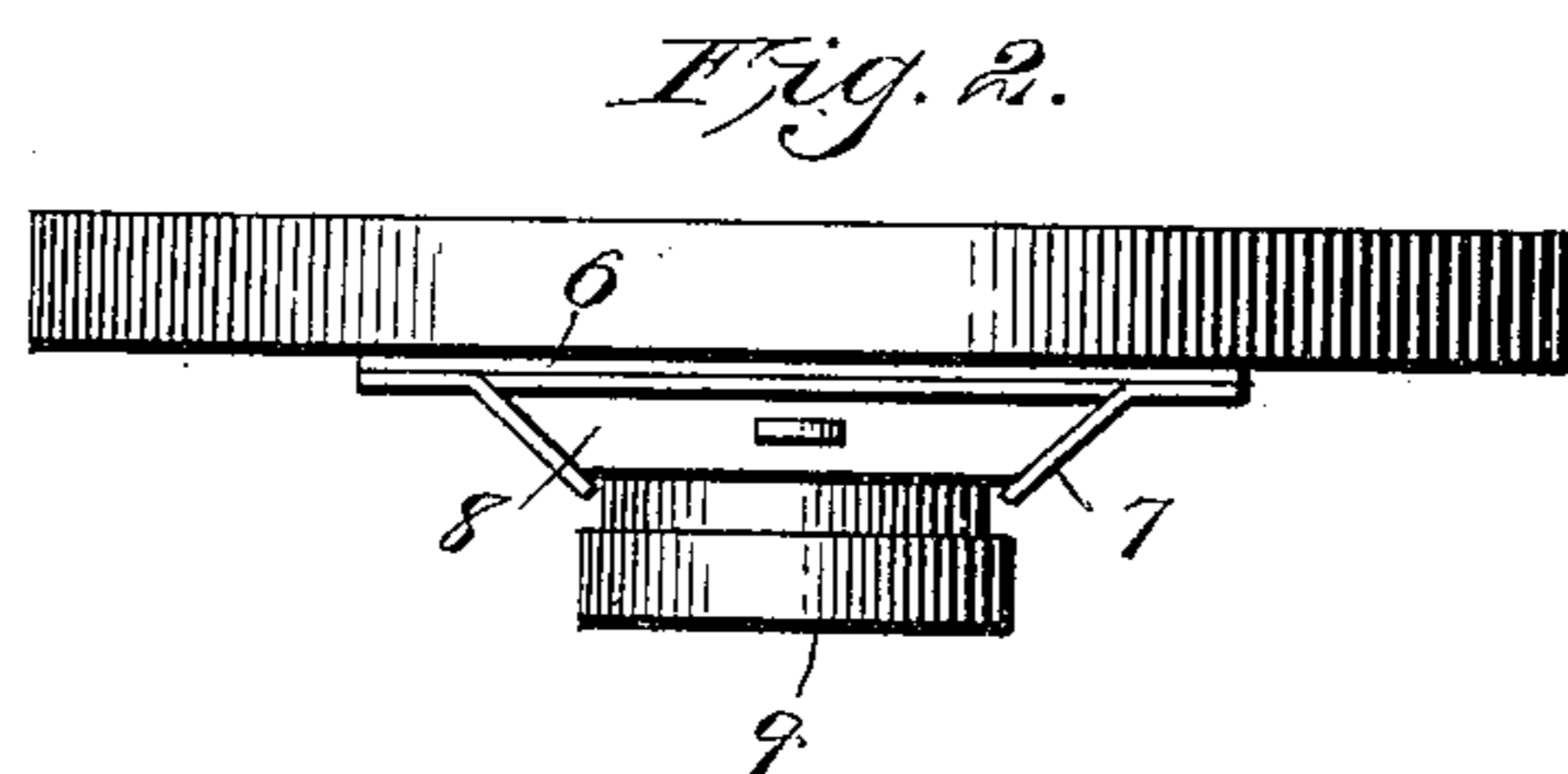
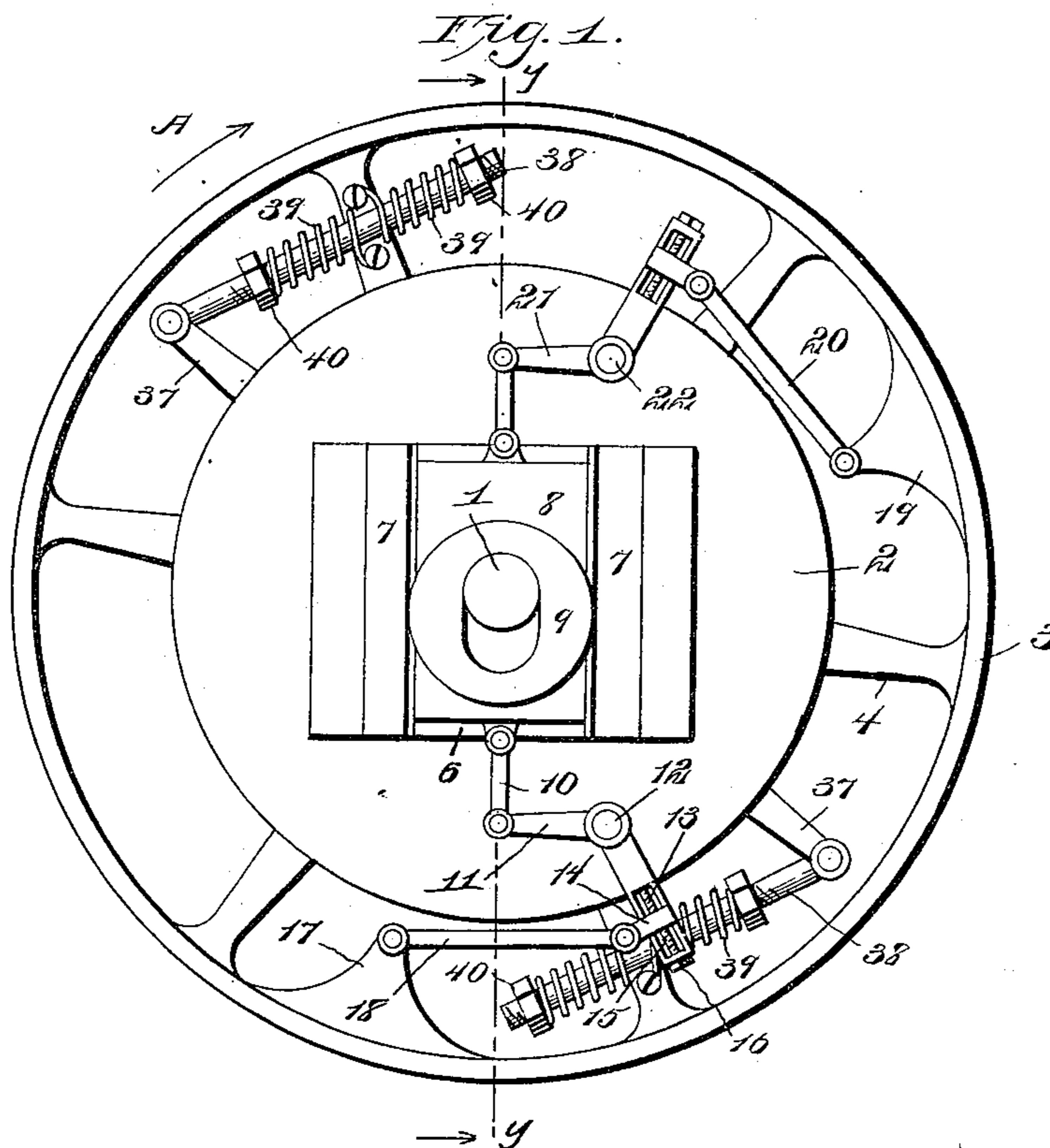
Patented Nov. 20, 1900.

E. IRWIN.  
GOVERNOR FOR ENGINES.

(Application filed Feb. 20, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses

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Fig. 3.

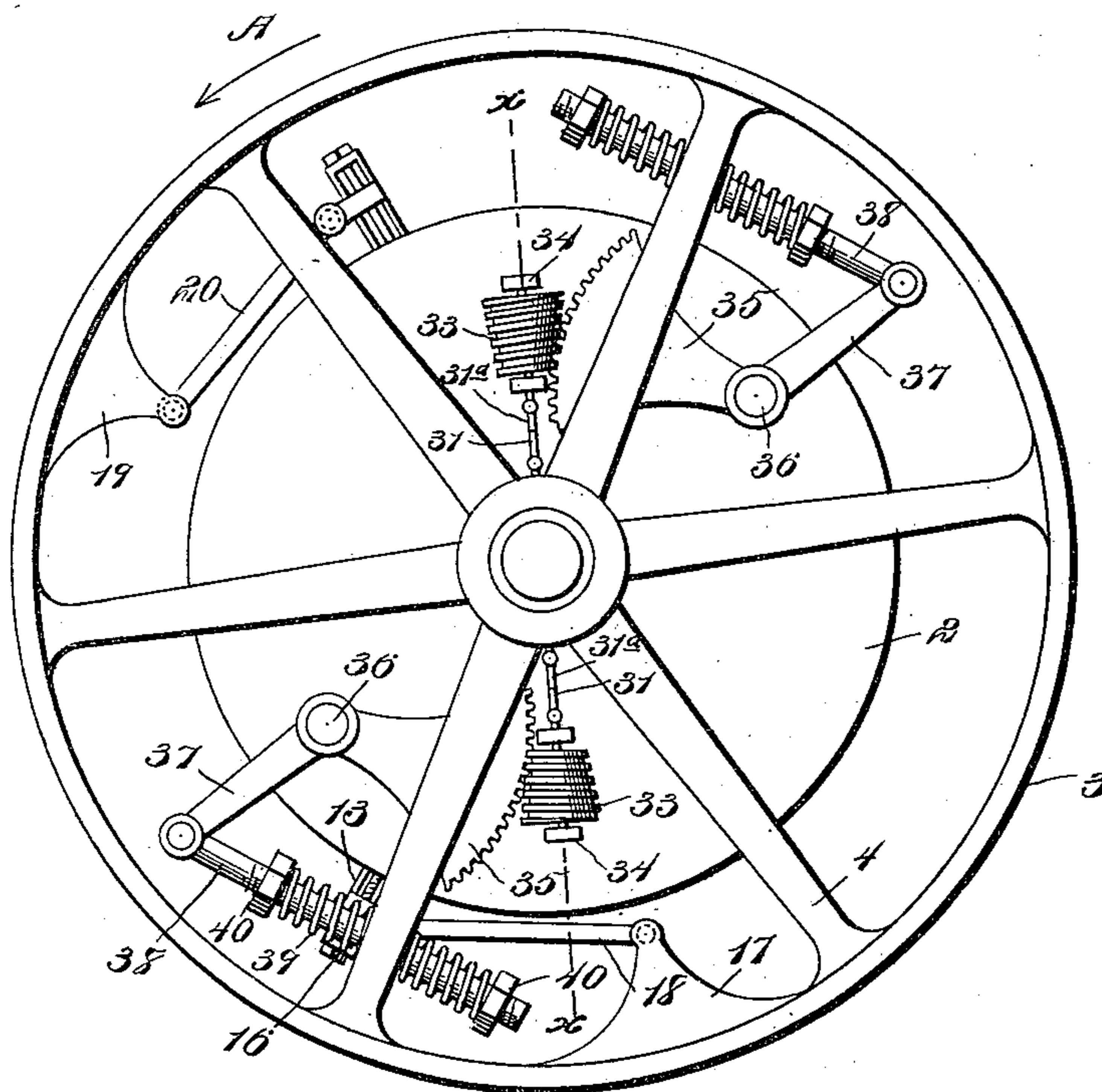
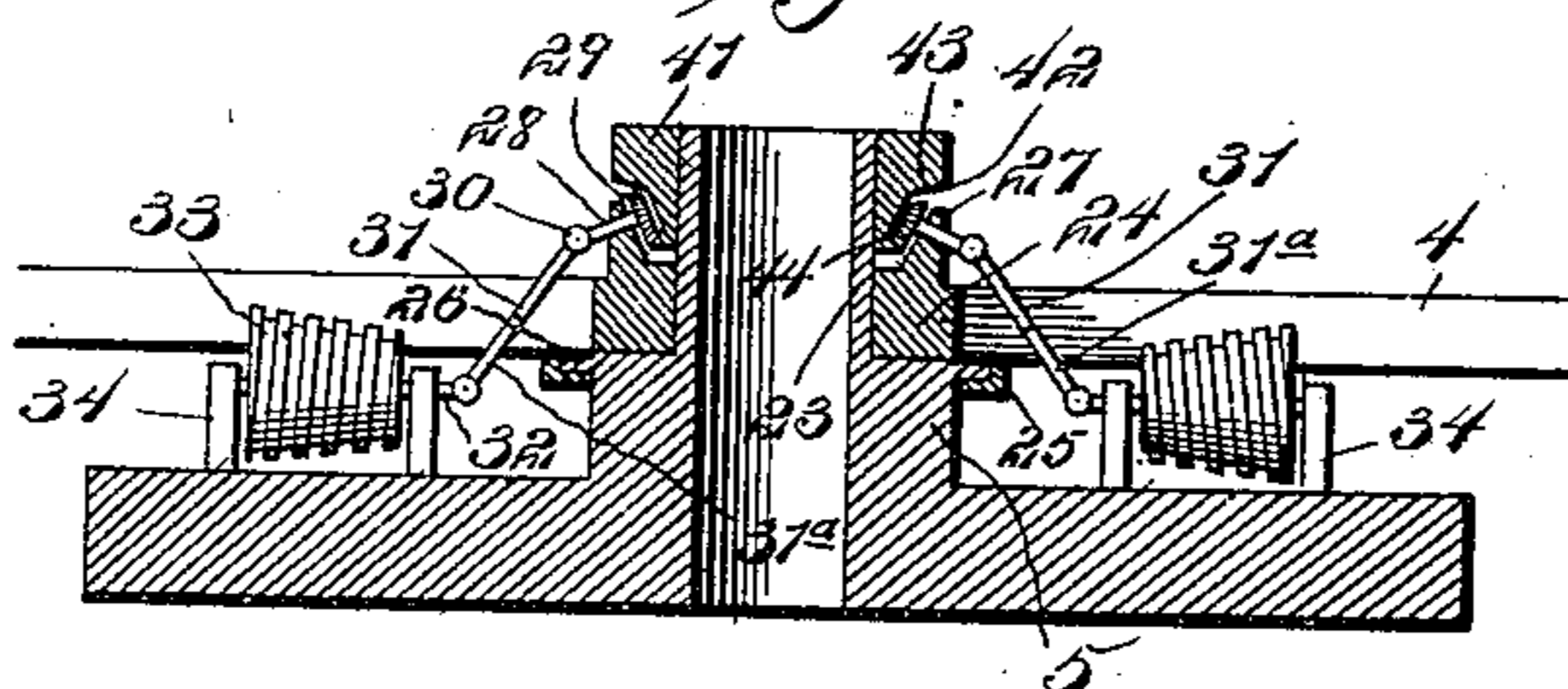


Fig. 4.



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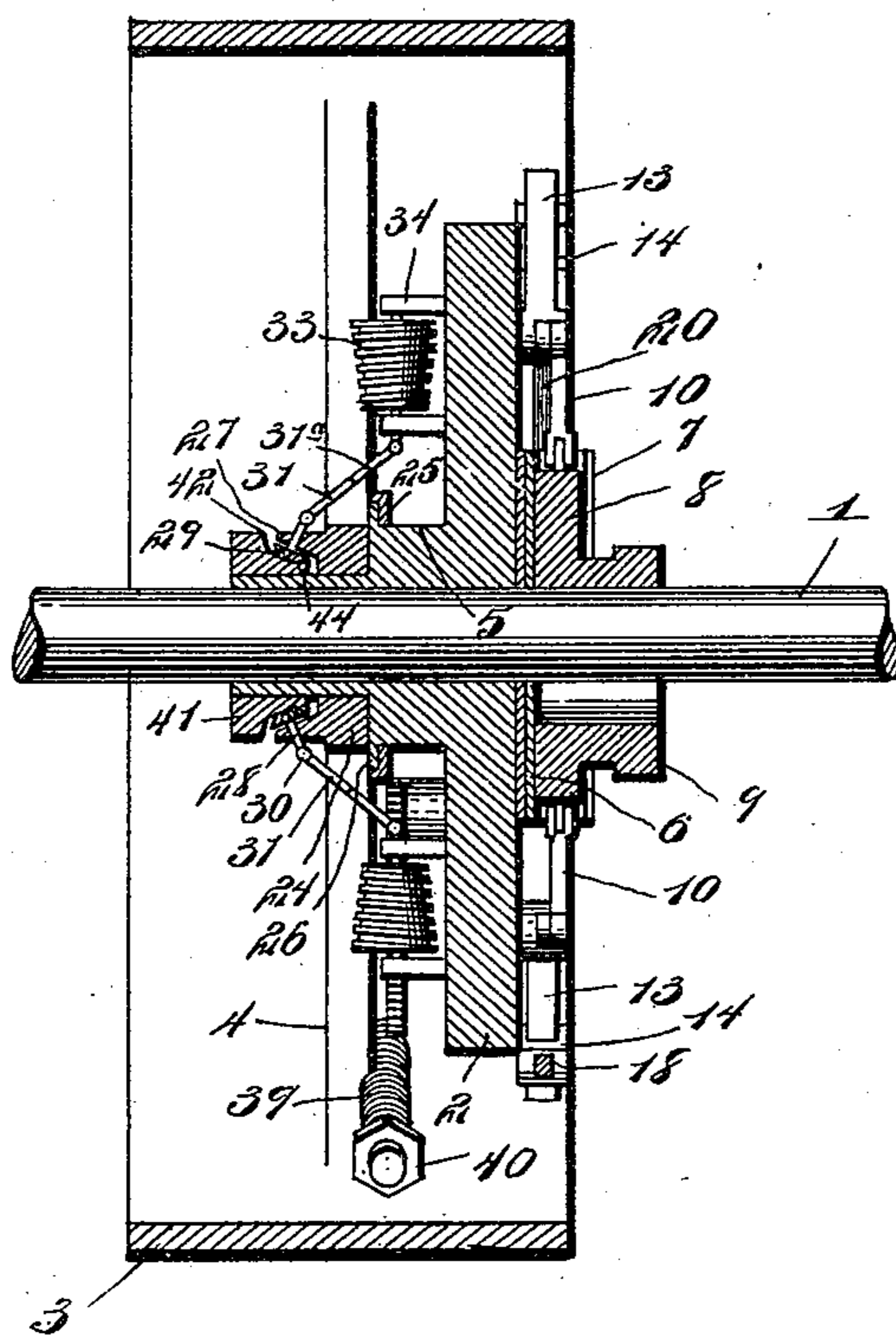
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Fig. 5.



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# UNITED STATES PATENT OFFICE.

EDWARD IRWIN, OF GRIDLEY, ILLINOIS.

## GOVERNOR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 662,121, dated November 20, 1900.

Application filed February 20, 1900. Serial No. 5,932. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD IRWIN, a citizen of the United States, residing at Gridley, in the county of McLean and State of Illinois, have invented certain new and useful Improvements in Governors for Engines, of which the following is a specification.

This invention relates to new and useful improvements in governors for engines; and its primary object is to provide a device of this character adapted to automatically maintain the engine at a desired speed unaffected by the sudden application of a load thereto.

A further object is to provide means whereby the speed of the engine may be increased or diminished while in operation.

To these ends the invention consists in the novel construction and combination of parts hereinafter described and claimed, and illustrated in the accompanying drawings, showing the preferred form of my invention, and in which—

Figure 1 is a side elevation of the governor and belt-pulley. Fig. 2 is a top plan view of the disk and the slide and eccentric thereon. Fig. 3 is an elevation of the opposite side of the pulley and governor. Fig. 4 is a section on the line *xx*, Fig. 3, with the eccentric and its operating mechanism removed; and Fig. 5 is a section on line *yy* of Fig. 1.

Referring to said figures by numerals of reference, 1 is the crank-shaft of an engine, to which is keyed a disk 2, arranged adjacent to the belt-pulley 3, provided with suitably arranged spokes, as 4, and loosely mounted upon a hub 5 of the disk 2. Secured to the central portion of one of the faces of the disk 2 is a rectangular plate 6, to which are bolted parallel inclined strips 7, adapted to serve as a guide for a slide 8, loosely mounted therebetween and having an eccentric 9 formed therewith, as shown, adapted to operate the valve of the engine. Pivotally connected to the lower edge of the slide 8 is a link 10, the opposite end of which is pivoted to the end of a bell-crank lever 11, loosely mounted on a stud 12, projecting from the face of the disk 2. The opposite end of the lever 11 is slotted, as at 13, to receive a block 14, which is engaged by and adjustably on a screw 15, extending longitudinally within said slot 13

and engaging the end of the lever 11. This screw is provided with a suitable head, as 16, whereby the same is readily turned when it is desired to adjust the block 14 back and forth within the slot. The pulley 3 is provided with a bracket 17, formed on its inner periphery and connected by means of a link 18, pivoted thereto, to the block 14, to which it is also pivotally secured. A similar bracket 19 is formed on the opposite portion of the wheel 3, and this is connected in a similar manner by a link 20 to a bell-crank lever 21, similar in construction, &c., to lever 11 and provided with a link connection with the upper edge of slide 8. This bell-crank lever is also pivoted upon a stud 22, projecting from the face of the disk 2. Projecting from the opposite face of the disk 2 is the hub 5, before mentioned. Said hub is reduced in diameter, as at 23, and upon said reduced portion is mounted the hub 24 of the pulley 3. This hub is provided with a flange 25, adapted to extend over and partially inclose a flange 26, formed on the hub 5 of disk 2, thereby retaining the pulley and disk in proper working relation. The hub 24 of pulley 3 is provided at its outer end with an inwardly-tapered annular flange or shoulder 27, within which at diametrically opposite sides are journaled the short shafts 28 of beveled pinions 29. These shafts are connected at the end by means of a universal joint 30 to a connecting-shaft formed of two telescoping sections 31 and 31<sup>a</sup>, adapted to revolve together and similarly connected to the shaft 32 of a preferably-tapered worm 33, journaled in brackets 34, secured to the face of the disk. Each worm is adapted to engage with a toothed segment 35, mounted upon a stud 36, projecting from the disk 2, and said segment has an arm 37, pivotally connected at its end to a rod 38. This rod is encompassed by two coiled springs 39, the inner ends of which are secured in any suitable manner to a spoke 4 of the pulley 3. Nuts, as 40, are screwed upon the bolt, as shown, and adapted to bear against the ends of the springs and regulate the tension thereof. Loosely mounted upon the reduced portion 23 of hub 5 is a sleeve 41. This sleeve is provided in its inner end with an annular groove 42, having oppositely-inclined sides 43 and 44, respectively, and each pro-

vided with teeth adapted to be brought into engagement with cogs 29, hereinbefore described.

In operation it is obvious that the pulley 3 will revolve with the disk 2, which is connected to the shaft. Supposing the pulley 3 to be revolving in the direction of the arrow A, Figs. 1 and 3, when a load is put upon the engine the pulley-wheel will be slightly retarded in its revolution, bearing back upon the springs 39, which serve to cushion the same, the arms and segments 37 and 36 being held in fixed position by worms 33. By means of this slight backward movement of the pulley 3 the links 18 turn the bell-crank levers 11 upon their pivots 12 and force the slide 8 downward, which will carry the eccentric 9 farther out of center, permitting it to give more travel to the valves and increasing the amount of steam admitted to the cylinder. As the strain or load upon pulley 3 decreases the springs 39, bearing upon the nuts 40, gradually return the pulley to its normal position in relation to the disk 2, at the same time reversing the movement of the bell-crank levers 11 and moving the slide 8 upward, thereby reducing the sweep of the eccentric and decreasing the amount of steam fed to the cylinder. By means of the slots 13 and the screws 15 within the levers 11 the blocks 14 may be adjusted back and forth, giving the slide 8 more or less travel, as desired. By adjusting the nuts 40 toward each other the tension of the springs 39 is increased, thereby reducing the movement of the pulley in relation to the disk. When it is desired to increase the speed of the engine while in motion, it is merely necessary to grasp the sleeve 41 and slide the same upon the reduced portion 23 of hub 5 until the gears 29 mesh with the teeth on one of the sides 43 or 44. This will cause the worms 33 to revolve as long as the sleeve is held, the revolution of the worms causing the segments 35 to swing upon their pivots, and thereby forcing the pulley backward in relation to the disk 2 and causing the slide 8 and its eccentric to move farther out of the center. When the sleeve 41 is released, it will revolve freely with the hub 24. It is obvious that the worms 33 will retain the disk and pulley in the relation to which they are adjusted until the movement thereof is reversed by sliding the sleeve 41 into engagement with the opposite set of teeth in groove 42 thereof, thereby decreasing the speed of the engine. If desired, a wear-plate, as 45, may be placed between the slide 8 and plate 6; but this may be dispensed with, if desired.

In the foregoing description I have shown the preferred form of my invention; but I do not limit myself thereto, as I am aware that modifications may be made therein without departing from the spirit or sacrificing the advantages thereof, and I therefore reserve the right to make such changes as fairly fall within the scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a governor, the combination with a shaft; of a disk secured thereto having an eccentric containing-plate slidably mounted thereon; a bell-crank lever pivoted to the disk and connected to the plate; a block adjustably secured within the lever; a pulley loosely mounted upon the shaft; and a link pivotally secured to said pulley and block.

2. In a governor, the combination with a shaft; of a disk secured thereto; an eccentric slidably mounted upon the disk; a lever pivoted to the disk; a link connection between said lever and eccentric; a block adjustably secured within the lever; a pulley loosely mounted upon the shaft; and a link pivotally secured to said pulley and block.

3. In a governor the combination with a disk having an eccentric slidably mounted thereon, and a pulley adapted to operate said eccentric by its movement in relation to the disk, of a toothed segment pivoted to the disk, an arm thereto, a spring-encircled rod pivoted to the arm, said springs secured to the pulley, a worm engaging said segment, a gear journaled within the hub of the pulley, a connecting-shaft between the gear and worm provided with universal joints, a sleeve loosely mounted on the shaft, and teeth thereon adapted to be brought into engagement with the gear.

4. In a governor the combination with a shaft, having a disk secured thereto, an eccentric slidably mounted on said disk, a bell-crank lever pivoted to the disk, a link pivoted to the lever and eccentric, a block adjustably secured within said lever, a pulley loosely mounted upon the shaft, and a link pivotally secured to said pulley and block, of a toothed segment pivoted to the disk, an arm thereto, a spring-encircled rod pivoted to the arm, said springs secured to the pulley, a worm engaging said segment, a gear journaled within the hub of the pulley, a connecting-shaft between the gear and worm provided with universal joints, a sleeve loosely mounted on the shaft, and teeth thereon adapted to be brought into engagement with the gear.

5. The combination with a shaft and a disk having a laterally-extending hub secured to said shaft; of a pulley loosely mounted upon the hub; a toothed sleeve also loosely mounted upon the hub; a pinion journaled within the pulley, and meshing with the teeth of the sleeve; a worm mounted upon the disk and adapted to receive motion from said pinion; a toothed segment pivoted to the disk and engaging said worm; and a resilient connection between said segment and pulley.

6. The combination with a shaft having a disk secured thereto; of an eccentric slidably mounted upon the disk; a pulley loosely mounted upon the shaft; means whereby said eccentric is operated by the movement of the

5 pulley in relation to the disk; a toothed segment mounted upon the disk and having a spring connection with the pulley; a worm engaging said segment; and means for revolving the worm, independently of the motion of the pulley, for regulating the tension of the springs.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD IRWIN.

Witnesses:

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H. S. SUTER.